

**Table 6**  
**Changes to the Assessment Endpoint Table**

Receptor of Concern	Assessment Endpoint	Measures of Effect and Exposure	Changes to the table	Justification/Notes	Data needs (numbers correlate to the Data Needs Table)
<b>Benthic</b>					
The benthic community	Survival, growth and reproduction	Sediment toxicity testing to assess effects (direct toxicity and/or a predictive approach will be evaluated).	Modify the Measures of Effect and Exposure to include: 1) Compare tissue-based TRVs against field collected benthic tissue data (e.g., clams, mussels and multi-plate tissue) and results from laboratory bioaccumulation testing; and 2) add assessment of risk from groundwater discharge areas using existing bioassay tests, comparison of transition zone water to AWQC and either collecting tissue from groundwater discharge areas or doing in-situ toxicit testing.	(1) The two tests being run (10 and 28 day tests) do not represent bioaccumulation. (2) Need a method to assess risk to benthic community from groundwater discharge.	1, 2, 4, 5
Shellfish (bivalves)	Survival, growth and reproduction	Tissue-based TRVs (provided sufficient clam tissue can be obtained) and benthic bioassay toxicity testing. For TBT, derive a site specific biota-sediment accumulation factor or use screening value based on sediment concentrations <sup>1</sup> .	No change.		1, 4, 5
Crayfish	Survival, growth and reproduction	Tissue based TRV approach.	No change.		1, 4
<b>Fish</b>					
<b>Invertivore</b>					
Juvenile Chinook Salmon <sup>2</sup>	Survival and growth	A combination of dietary TRV and tissue based TRV approach. For metabolized COPCs, determine potential exposure through diet, tissue, and/or biomarker analysis and assess potential effects on survival and growth. Compare water concentrations to AWQC criteria and literature-based values for protection of early life stages of salmonids.	Modify the Measures of Effect and Exposure to include TRVs that include reproductive effects (as a surrogate for growth).	Reproductive effects are should be used a surrogate for growth because a signifcant amount of reproductive data is availalable.	7
Adult Chinook Salmon <sup>2</sup>	Survival, growth and reproduction	Adult Chinook salmon will be assessed for olfactory function of returning, pre-spawning adults. Surface water data will be evaluated to determine if contaminant concentrations may cause changes to olfactory function that may affect swimming, homing behavior and ultimately reproduction.	Adding adult Chinook salmon to Assessment Endpoint Table.	Adult Chinook represents a unique exposure-receptor pathway, and is tied directly to salmon survival and reproduction.	
Peamouth	Survival, growth and reproduction	A combination of dietary and tissue based TRV approach. Compare water concentrations to literature-based or AWQC criteria for protection of early life stages.	No change.	Note: Reexamine peamouth and juvenile Chinook diets to determine how similar they are, and decide whether peamouth is an adequate representative of juvenile Chinook.	7, 8
Sculpin <sup>2</sup>	Survival, growth and reproduction	A combination of dietary and tissue based TRV approach. For metabolized COIs, determine potential exposure through diet and/or biomarker analysis and assess potential effects on survival, growth and reproduction. Compare water concentrations to literature-based or AWQC criteria for protection of early life stages.	No change.		4, 6, 7, 8, 10
<b>Omnivore/Herbivore</b>					

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Carp (Surrogate Fish Tissue) <sup>3,4</sup>	Survival, growth and reproduction	Tissue-based TRV approach for dioxin-likecontaminants using literature values and incorporating toxic equivalent (TEQs) based on the World Health Organization toxic equivalent factors (TEFs). Risk from other compounds assessed in uncertainty analysis.	No change.		
Largescale Sucker <sup>2,3,5</sup>	Survival, growth and reproduction	A combination of dietary and tissue based TRV approaches. For metabolized COIs, determine potential exposure through diet, and/or biomarker analysis and assess potential effects on survival, growth, and reproduction. Compare water concentrations to literature-based or AWQC criteria for protection of early life stages. Incorporate sediment ingestion as part of the dietary TRV. Note prevalence of external lesions or tumors.	No change.		7, 8, 9, 11
White Sturgeon	Survival, growth and reproduction	A combination of dietary and tissue based TRV approaches. Compare water concentrations to literature-based or AWQC criteria for protection of early life stages. Modeling and/or additional data collection will be required if current data is inadequete to assess exposure and effects. <sup>7</sup>	No change.	Note: Assume 100% site fidelity for all sturgeon assessment endpoints.	7, 8, 9, 11, 12, 13
Smallmouth Bass	Survival, growth and reproduction	A combination of dietary and tissue based TRV approaches. Compare water concentrations to literature-based or AWQC criteria for protection of early life stages.	No change.		7, 8, 9
<b>Piscivores</b>					
Northern Pikeminnow	Survival, growth and reproduction	A combination of dietary and tissue based TRV approaches. Compare water concentrations to literature-based or AWQC criteria for protection of early life stages.	No change.		7, 8, 9, 11
<b>Detritivores</b>					
Pacific Lamprey Amocoetes	Survival and growth	Tissue residue concentrations compared to relevant TRV or surrogate. In absence of tissue data, modeling to determine dietary and tissue concentrations. Compare water concentrations to literature-based or AWQC criteria for protection of early life stages.	Refinements to the approach for assessing risks to Pacific Lamprey amocoetes is required.	Pacific Lampry amocoetes are unique due to their special species status, high lipid content and life history.	Direction on assessing riskto Lamprey and data needs coming soon
<b>Wildlife</b>					
Bald Eagle	Survival, growth and reproduction	Dietary-based approach incorporating food chain transfer of contaminants from appropriate fish species (assuming all exposure comes from prey fish). Assess dioxin-like contaminants using a TEQ approach based on appropriate surrogate fish tissue data. Use TRVs based on the most sensitive life stages, which include egg or embryo-based TRVs for DDT and metabolites, PCBs, and dioxin-like compounds. Egg concentrations will be determined by egg analysis or by food chain modeling.	No change.	Note: Bald eagle can be represented by osprey, assuming individual level protection and 100% site use (no migration factor). Need to estimate contaminant concentrations in Bald eagle eggs to validate the Food Web Model and assess risk to eagles.	14

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Hooded Merganser	Survival, growth and reproduction	Dietary based TRV approach. Dietary based analysis using sculpin and/or invertebrate tissue data to represent feeding guild. In the absence of appropriate fish and invertebrate tissue concentrations, modeled concentrations will be used. For dioxin like contaminants (carp or appropriate prey species), use a TEQ-based approach to assess reproductive effects.	No change.	Note: Two ingestion scenarios should be considered - 100% invertebrates and 100% fish - for a conservative scenario.	1, 2, 4, 5, 6
Osprey	Survival, growth and reproduction	Dietary-based approach incorporating food chain transfer of contaminants from appropriate fish species (primarily pikeminnow and sucker). Assess dioxinlike contaminants using a TEQ approach based on appropriate surrogate fish tissue data. Use TRVs based on the most sensitive life stages, which include egg or embryo-based TRVs for DDT and metabolites, PCBs, and dioxin-like compounds. Egg concentrations will be determined by egg analysis or by food chain modeling.	No change.	Note: Need to understand contaminant concentrations in osprey eggs to validate the Food Web Model and assess risk to osprey.	14
Spotted Sandpiper <sup>3</sup>	Survival, growth and reproduction	Dietary based TRV approach. Sediment concentrations determined from site specific evaluation. In the absence of appropriate invertebrate tissue concentrations, use modeled invertebrate tissue concentrations.	No change.		1, 2, 4, 5, 6, 15
Mink <sup>6</sup>	Survival, growth and reproduction	Dietary based TRV approach, considering both relevant fish species concentrations and invertebrate (crayfish) components of the diet. For dioxin-like contaminants (carp or appropriate prey species), use a TEQ-based approach to assess reproductive effects.	No change.	Otter has a different diet than mink (feeds on carp). Need to ensure that two ranges of diet are assessed - one for mink and one for otter.	1, 2, 4, 5, 6, 15
<b>Amphibians</b>	Survival, growth and reproduction	Water concentrations compared to literature-based values or AWQC to protect sensitive life stage.	No change.	Note: Use amphibian and bird endpoints to provide protection for reptiles.	3, 15
<b>Plants</b>					
Aquatic Plants	Survival, growth and reproduction	Comparison of emergent aquatic plant exposure based on concentrations of chemicals in sediment and relevant toxicological data.	No change.		3, 15

**Footnotes:**

<sup>1</sup> For TBT, suggested screening value of 6,000 ng/g OC (based on 2 % OC), which represents a dry wt concentration of 120 ng/g.

<sup>2</sup> Considered representative of fish exposure to PAHs. Analysis should include an analysis of whether these compounds are found in the diet of the fish receptors, as well as if found in tissue analysis.

<sup>3</sup> Considered representative of sediment ingestion.

<sup>4</sup> Carp is not a receptor of concern for the ecological risk assessment.; whole-body fish tissue (i.e., carp) was analyzed for dioxin-like chemicals, including PCB congener analysis, and is a surrogate for other fish species for these chemicals.

<sup>5</sup>Represents a resident broadcast spawner. Therefore, exposure to sensitive early life stages and eggs will be assessed to all contaminants, including PAHs and dioxin like compounds.

<sup>6</sup>Mink was selected to also represent river otter. Therefore, the dietary requirements of the river otter, which include a fish diet, must be assessed.

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<sup>7</sup>Possible approaches for sturgeon will be developed through the ecological risk assessment TM process and the approach for the site will be selected following discussions between the LWG, EPA and its partners.